

CLAIMS:

1. A method of authenticating that a test polymer is an authenticatable polymer, wherein the authenticatable polymer has an authentication signal and comprises a substrate polymer and an optically variable tag, the optically variable tag having a fluorescence emission whose wavelength or intensity change over time, the method comprising

subjecting the test polymer to a stimulus sufficient to cause fluorescence of the optically variable tag,

determining a test signal from the fluorescence of the test polymer, and

authenticating that the test polymer is an authenticatable polymer if the test signal is the same as the authentication signal of the authenticatable polymer.

2. The method of claim 1 wherein the wavelength and intensity of the fluorescence emission changes over time.

3. The method of claim 1 wherein the optically variable tag comprises an oxadiazole derivative.

4. The method of claim 3 wherein the optically variable tag comprises at least one of tert-butyl phenyl oxadiazole, bis(Biphenylyl) oxadiazole, and combinations of the foregoing optically variable tags.

5. The method of claim 1 wherein the optically variable tag has a first peak position of about 160 to about 1100 nm and a second peak position that is shifted from the first peak position by about 2 to about 300 nm.

6. The method of claim 5 wherein the optically variable tag has a first peak position of about 250 to about 750 nm and a second peak position that is shifted from the first peak position by about 5 to about 200 nm.

7. The method of claim 6 wherein the optically variable tag has a first peak position of about 300 to about 700 nm and a second peak position that is shifted from the first peak position by about 10 to about 100 nm.

8. The method of claim 1 wherein the optically variable tag is present in the authenticatable polymer in an amount of no more than or equal to about 2% by weight, based on the total weight of the authenticatable polymer.

9. The method of claim 1 wherein the optically variable tag is present in the authenticatable polymer in an amount greater than or equal to about 10^{-18} weight percent, based on the total weight of the authenticatable polymer.

10. The method of claim 9 wherein the optically variable tag is present in the authenticatable polymer in an amount greater than or equal to about 10^{-12} weight percent, based on the total weight of the authenticatable polymer.

11. The method of claim 10 wherein the optically variable tag is present in the authenticatable polymer in an amount greater than or equal to about 10^{-6} weight percent, based on the total weight of the authenticatable polymer.

12. The method of claim 1 wherein the optically variable tag is present in the authenticatable polymer in an amount of at least 0.0001 weight percent, based on the total weight of the authenticatable polymer.

13. The method of claim 12 wherein the optically variable tag is present in the authenticatable polymer in an amount of about 0.0001 to about 0.05 weight percent, based on the total weight of the authenticatable polymer.

14. The method of claim 1 wherein the substrate polymer is polycarbonate.

15. The method of claim 1 wherein the test signal is at least one selected from the group consisting of intensity of fluorescence, shape of a fluorescence peak, location of a fluorescence peak, duration or decay of fluorescence over time or after removal of a heat source, the ratio of fluorescence intensity at least two different wavelengths and combinations thereof.

16. The method of claim 1 wherein the test signal is a ratio of the fluorescence intensity.

17. An authenticatable polymer comprising
a substrate polymer, and
an optically variable tag having a fluorescence emission whose wavelength or intensity changes over time.

18. A method of making an authenticatable polymer, comprising
incorporating together a substrate polymer and an optically variable tag to make an authenticatable polymer,
wherein the optically variable tag has a fluorescence emission having a wavelength or intensity that changes over time.

19. A method of making an authenticatable article, comprising
providing the authenticatable polymer of claim 18, and
forming an authenticatable article from the authenticatable polymer.

20. The method of claim 19 wherein forming the article from the authenticatable polymer comprises melting the authenticatable polymer.

21. The method of claim 20 further comprising extruding or molding the authenticatable polymer.

22. The method of claim 21 wherein said molding comprises injection molding the authenticatable polymer.

23. The method of claim 22 wherein the authenticatable article is an optical disk.

24. The method of claim 23 wherein the optical disk comprises a single plastic substrate.

25. The method of claim 23 wherein the optical disk comprises more than one substrate.

26. The method of claim 25 wherein the optical disk comprises more than one substrate and wherein the read substrate is made from an authenticatable polymer.

27. An authenticatable article made by the method of claim 19.

28. The authenticatable article of claim 27 that is an optical disk.